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A Table of the Positions of Observatories, with Constants useful in Correcting Extra-Meridian Observations for Parallax. By Lieut.-General Tennant, R.E., F.R.S.

The discontinuance of old Observatories and the formation of new ones renders the occasional revision of such tables as the present one desirable. The extension of the electric telegraph has facilitated the determination of longitudes, so that the results recently published may be considered practically perfect as regards both elements of position: I hope therefore that the places I now give may require, except in one or two cases, little amendment.

Starting with Mr. Lancaster's "Liste Générale," I have omitted some Observatories which never should have been admitted as astronomical establishments, such as Calcutta and Bombay. Then I have examined the positions with the *Berliner Jahrbuch*, *Connaissances des Temps*, *Nautical Almanac*, and *American Nautical Almanac*, preferring each authority for the places of its own nation. A few corrections have been made from the *Monthly Notices* and other sources, and some new Observatories have been added, as well as some omitted, which I had no reason to suppose were very active. For the places of Mr. Brooks's new Observatory (Smith Observatory) at Geneva I am indebted to that gentleman. But I have not been able to get the position of the new Dearborn Observatory, and we now hear that the establishment at Edinburgh is to be moved, but it is useless to wait till changes cease.

In computing the constants I have used Col. Ross Clarke's figure of the Earth, which is certainly the best known, and I have used 8″·78 for the Mean Solar Parallax. The table is otherwise only a recomputation and slight extension of the corresponding one in Oppolzer's *Lehrbuch*, vol. i. The figure of the Earth makes but slight changes, but it is otherwise with the Solar Parallax. The value I have taken is a very small one, so that a constant addition to the last three logarithms will correct to any value likely to be preferred: Newcomb's parallax requires an addition of 0·0034.

The formulæ I have used are Oppolzer's:

$$\tan\phi_1 = \frac{b}{a}\tan\phi : \tan\phi' = \frac{b}{a}\tan\phi_1;\ \log\frac{a}{b} = 9{\cdot}9985176.$$

$$A = \frac{\pi}{15}\cos\phi_1;\ D = \pi.\frac{b}{a}\sin\phi_1;$$

and I have added

$$P = \pi.\frac{\cos\phi_1}{\cos\phi'},\ = h\pi \text{ of Oppolzer,}$$

which is used to correct the solar places in computing orbits.

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If θ be the Sidereal Time, α and δ the true, and α' and δ' the observed, Right Ascensions and Declinations, then

$$\tan\gamma = \frac{\tan\phi'}{\cos(\theta-\alpha')}\,;\quad \alpha-\alpha' = \frac{A}{\rho}\,\frac{\sin(\theta-\alpha')}{\cos\delta'}\,;\quad \delta-\delta' = \frac{D}{\rho}\,\frac{\sin(\gamma-\delta')}{\sin\gamma}.$$

A practice has arisen (largely followed in the United States) of calling an observatory after some person whom it is desired to commemorate. The result is not always convenient. I have however generally used these names in the following table, and add a list of synonyms for the purpose of further identifying places of observation.

The Observatory at Albany is Dudley Observatory.
,, ,, Amherst ,, Lawrence ,,
,, of Michigan University ,, Ann Arbor ,,
,, at Cambridge, U.S. ,, Harvard Coll. ,,
,, ,, Chicago ,, Dearborn ,,
,, ,, Clinton, N.Y. ,, Litchfield ,,
,, ,, Glasgow (Miss.) ,, Morrison ,,
,, ,, Evanston Isle ,, New Dearborn ,,
The Dartmouth Observatory ,, at Hanover.
The Observatory at Madison (Wis.) ,, Washburn Observatory.
,, ,, Mount Hamilton ,, Lick ,,
,, ,, New Haven ,, Winchester ,,
,, of Columbia College ,, at New York.
,, at Northfield ,, Carleton Coll. ,,
The Radcliffe Observatory ,, at Oxford.
,, Vassar College Observatory ,, at Poughkeepsie.
The Observatory at Richmond (Virg.) ,, Leander McCormick Observatory.
,, ,, Rochester ,, Warner Observatory.
,, ,, South Bethlehem ,, Sayre ,,
,, of Vanderbilt University is at Nashville.

P.S.—I have thought it best to give the new place of Dearborn Observatory from Keith Johnston's place of Evanston, correcting for error of longitude of Chicago. It will serve better for reducing observations than the old value, though it is not accurate.

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Positions of Observatories and Constants for Parallaxes.

Names.	Longitudes from Greenwich. Time.	Longitudes from Greenwich. Parts of Day.	Correction to S.T.M.N.	Latitudes.	tan φ′.	Constants. log A.	Constants. log D.	log P.	
	h m s	d	s	° ′ ″					
Adelaide	+ 9 14 21·3	+0·384969	−91·06	−34 35 34	9·8411$_n$	9·6816	0·6987$_n$	0·9430	
Alfred Centre	− 5 11 07·0	−0·216053	+51·11	+42 15 20	9·9554	9·6374	0·7688	0·9428	
Algiers	+ 0 12 16·9	+0·008529	− 2·02	+36 44 00	9·8699	9·6718	0·7178	0·9430	
Allegheny	− 5 20 02·9	−0·222256	+52·58	+40 27 42	9·9279	9·6493	0·7533	0·9429	
Annapolis	− 5 05 56·4	−0·212458	+50·26	+38 58 54	9·9051	9·6586	0·7398	0·9429	Naval Acad.
Ann Arbor (Mich.) ...	− 5 34 55·1	−0·232582	+55·02	+42 16 48	9·9557	9·6372	0·7690	0·9428	Near Detroit
Antwerp	+ 0 17 38·6	+0·012252	− 2·90	+51 12 28	0·0919	9·5652	0·8332	0·9426	A. de Boë
Arcetri	+ 0 45 03·1	+0·031286	− 7·40	+43 45 14	9·9781	9·6268	0·7811	0·9428	Near Florence
Armagh	− 0 26 35·5	−0·018466	+ 4·37	+54 21 13	0·1414	9·5339	0·8514	0·9424	
Athens	+ 1 34 54·9	+0·065913	−15·59	+37 58 20	9·8894	9·6647	0·7302	0·9429	
Beloit Coll. (Wis.) ...	− 5 56 07·3	−0·247307	+58·50	+42 30 09	9·9591	9·6357	0·7709	0·9428	Smith Observatory
Bergen	+ 0 21 13·0	+0·014734	− 3·49	+60 23 54	0·2426	9·4622	0·8809	0·9424	
Berlin	+ 0 53 34·9	+0·037210	− 8·80	+52 30 17	0·1121	9·5527	0·8409	0·9426	
Berne	+ 0 29 45·7	+0·020667	− 4·89	+46 57 09	0·0267	9·6024	0·8051	0·9427	
Besançon	+ 0 23 57·2	+0·016634	− 3·93	+47 14 59	0·0312	9·5999	0·8072	0·9427	
Bilk	+ 0 27 05·0	+0·018808	− 4·45	+51 12 25	0·0919	9·5652	0·8332	0·9426	Near Düsseldorf
Birr Castle	− 0 31 40·9	−0·022001	+ 5·20	+53 05 47	0·1214	9·5468	0·8444	0·9425	Lord Rosse
Bologna	+ 0 45 24·9	+0·031538	− 7·46	+44 29 47	9·9894	9·6214	0·7869	0·9428	
Bonn	+ 0 28 23·3	+0·019714	− 4·66	+50 43 45	0·0845	9·5697	0·8302	0·9426	

Names.	Longitudes from Greenwich. Time.	Longitudes from Greenwich. Parts of Day.	Correction to S.T.M.N.	Latitudes.	tan φ′.	Constants. log A.	Constants. log D.	Constants. log P.	
	h m s	d	s	° ′ ″					
Bordeaux...	− 0 02 05·4	−0·001451	+ 0·35	+44 50 07	9·9945	9·6189	0·7895	0·9428	
Bothkamp	+ 0 40 31·2	+0·028197	− 6·66	+54 12 10	0·1390	9·5355	0·8506	0·9425	Baron von Bülow
Breslau	+ 1 08 08·9	+0·047325	−11·20	+51 06 57	0·0905	9·5661	0·8326	0·9426	
Brussels	+ 0 17 28·7	+0·012138	− 2·87	+50 51 11	0·0864	9·5685	0·8310	0·9426	
Buda Pesth	+ 1 16 15·4	+0·052956	−12·53	+47 29 35	0·0349	9·5979	0·8089	0·9427	Also Ofen
Cambridge	+ 0 00 22·8	+0·000264	− 0·06	+52 12 52	0·1076	9·5556	0·8392	0·9426	
Cape of Good Hope ...	+ 1 13 54·7	+0·051328	−12·14	−33 56 03	9·8249$_n$	9·6968	0·6878$_n$	0·4930	
Carleton College... ...	− 6 12 36	−0·258750	+61·21	+44 27 41	9·9889	9·6217	0·7866	0·9428	Northfield (Min.)
Carlsruhe	+ 0 33 36·5	+0·023339	− 5·52	+49 00 30	0·0580	9·5851	0·8192	0·9426	
Chabot	− 8 00 06·3	−0·333406	+78·87	+37 48 05	9·8867	9·6657	0·7285	0·9429	California Univ.
Chapultepec	− 6 36 38·2	−0·275442	+65·16	+19 25 18	9·5443	9·7420	0·4624	0·9432	Near Mexico
Christiania	+ 0 42 53·8	+0·029789	− 7·05	+59 54 44	0·2341	9·4686	0·8788	0·9424	
Cincinnati	− 5 37 41·3	−0·234506	+55·47	+39 08 20	9·9076	9·6576	0·7413	0·9429	
Coimbra	− 0 33 34·1	−0·023311	+ 5·51	+40 12 26	9·9240	9·6509	0·7511	0·9429	
Cologne	+ 0 27 51	+0·019340	− 4·58	+50 55 31	0·0875	9·5679	0·8315	0·9426	Dr. Klein
Copenhagen	+ 0 50 18·9	+0·034941	− 8·27	+55 41 13	0·1629	9·5195	0·8585	0·9425	
Cordoba	− 4 16 48·2	−0·178336	+42·19	−31 25 15	9·7830$_n$	9·6989	0·6580$_n$	0·9431	
Cracow	+ 1 19 50·4	+0·055444	−13·11	+50 03 50	0·0742	9·5758	0·8261	0·9426	
Dantzig	+ 1 14 39·6	+0·051847	−12·16	+54 21 18	0·1414	9·5339	0·8514	0·9425	
Dearborn (Old)	− 5 50 27·1	−0·243369	+57·57	+41 50 01	9·9489	9·6403	0·7653	0·9428	Chicago (U.S.)

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	h m s	d	s	° ′ ″					
Dearborn (New) ...	− 5 51 00	− 0·243750	+ 57·66	+ 42 05	9·9527	9·6386	0·7674	0·9428	Evanston (Ill.)
Dorpat	+ 1 46 53·6	+ 0·074231	− 17·56	+ 58 22 47	0·2077	9·4880	0·8718	0·9424	
Dresden	+ 0 54 54·8	+ 0·038134	− 9·02	+ 51 02 17	0·0893	9·5668	0·8322	0·9426	Baron v. Englehardt
Dublin	− 0 25 22	− 0·017616	+ 4·16	+ 53 23 13	0·1260	9·5439	0·8460	0·9425	Dunsink
Dudley	− 4 54 59·7	− 0·204858	+ 48·46	+ 42 39 50	9·9616	9·6346	0·7722	0·9428	Albany (N.Y.)
Dunecht	− 0 09 40·0	− 0·006713	+ 1·59	+ 57 09 36	0·1872	9·5027	0·8660	0·9424	Lord Crawford
Durham	− 0 06 19·8	− 0·004396	+ 1·04	+ 54 46 06	0·1481	9·5295	0·8536	0·9424	
Ealing	− 0 01 13	− 0·000845	+ 0·20	+ 51 31 07	0·0967	9·5623	0·8351	0·9426	A. A. Common
Edinburgh	− 0 12 43·6	− 0·008826	+ 2·09	+ 55 57 23	0·1673	9·5165	0·8599	0·9425	
Florence	+ 0 45 01·9	+ 0·031272	− 7·40	+ 43 46 04	9·9783	9·6267	0·7812	0·9428	Museum
Frankfurt	+ 0 34 47·1	+ 0·024156	− 5·71	+ 50 07 03	0·0750	9·5753	0·8264	0·9426	Dr. Epstein
Geneva	+ 0 24 36·8	+ 0·017093	− 4·04	+ 46 11 59	0·0152	9·6084	0·7997	0·9427	
Genoa	+ 0 35 41·4	+ 0·027525	− 5·86	+ 44 25 09	9·9882	9·6220	0·7863	0·9428	Naval Obs.
Georgetown (D.C.) ...	− 5 08 18·2	− 0·214101	+ 50·65	+ 38 54 26	9·9040	9·6590	0·7391	0·9429	
Glasgow	− 0 17 10·6	− 0·011928	+ 2·82	+ 55 52 43	0·1661	9·5173	0·8595	0·9425	
Göhlis	+ 0 49 29·6	+ 0·034370	− 8·13	+ 51 21 35	0·0942	9·5638	0·8341	0·9426	Herr Winkler
Gotha	+ 0 42 50·6	+ 0·029752	− 7·04	+ 50 56 38	0·0878	9·5677	0·8316	0·9426	
Göttingen	+ 0 39 46·4	+ 0·027620	− 6·53	+ 51 31 48	0·0969	9·5622	0·8352	0·9426	
Grätz	+ 1 01 47·9	+ 0·042916	− 10·15	+ 47 04 37	0·0285	9·6013	0·8060	0·9427	
Greenwich	0 00 00·0	0·000000	0·00	+ 51 28 38	0·0961	9·5627	0·8348	0·9426	

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	h m s	d	s	° ′ ″					
Grignon	+ 0 17 37·9	+0·012244	− 2·90	+47 33 42	0·0359	9·5974	0·8094	0·9427	
Halifax	− 0 07 28	−0·005185	+ 1·23	+53 42 09	0·1310	9·5407	0·8478	0·9425	E. Crossley
Hamburg	+ 0 39 53·8	+0·027706	− 6·55	+53 33 07	0·1287	9·5422	0·8470	0·9425	
Hanover (N.H.)	− 4 49 08·0	−0·200787	+47·50	+43 42 15	9·9774	9·6272	0·7807	0·9428	
Harrow (Hill Foot) ...	− 0 01 19·9	−0·000925	+ 0·22	+51 34 47	0·0977	9·5617	0·8355	0·9426	Col. Tupman
Harvard Coll. Obs. ...	− 4 44 31·0	−0·197581	+46·74	+42 22 48	9·9573	9·6365	0·7699	0·9428	Cambridge (Mass.)
Haverford (N.J.)(Coll.Obs.)	− 5 01 12·7	−0·209175	+49·48	+40 00 40	9·9210	9·6522	0·7493	0·9429	
Heidelberg	+ 0 34 48·5	+0·024172	− 5·72	+49 24 35	0·0642	9·5816	0·8218	0·9426	
Helsingfors	+ 1 39 49·2	+0·069319	−16·39	+60 09 43	0·2384	9·4653	0·8799	0·9424	
Hereny	+ 1 06 24·7	+0·046119	−10·91	+47 15 47	0·0314	9·5998	0·8073	0·9427	Von Gothard
Hudson	− 5 25 44·2	−0·226206	+53·51	+41 14 43	9·9400	9·6442	0·7602	0·9428	
Juvisy	+ 0 09 29	+0·006586	− 1·56	+48 41 36	0·0532	0·5878	0·8171	0·9427	C. Flammarion
Kalocsa	+ 1 15 55·7	+0·052728	−12·47	+46 31 41	0·0202	9·6058	0·8021	0·9427	Card. Haynald
Kasan	+ 3 16 29·1	+0·136448	−32·28	+55 47 24	0·1646	9·5183	0·8590	0·9425	
Kempshott (Jam.) ...	− 5 11 10	−0·216088	+51·12	+18 24 51	9·5194	9·7447	0·4402	0·9433	M. Hall
Kharkoff...	+ 2 24 54·7	+0·100633	−23·80	+50 00 10	0·0733	9·5763	0·8257	0·9426	
Kieff	+ 2 02 00·7	+0·084730	−20·04	+50 27 11	0·0802	9·5722	0·8285	0·9426	
Kiel	+ 0 40 35·7	+0·028191	− 6·67	+54 20 29	0·1412	9·5340	0·8513	0·9425	
Königsberg	+ 1 21 59·1	+0·056934	−13·47	+54 42 51	0·1472	9·5301	0·8533	0·9425	

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	h m s	d	s	° ′ ″					
Kremsmunster	+ 0 56 31·6	+0·039255	− 9·29	+48 03 24	0·0435	9·5932	0·8128	0·9427	
Kuffner Obs.	+ 1 05 11·1	+0·045267	−10·71	+48 12 48	0·0459	9·5919	0·8139	0·9427	Ottakring (Vienna)
La Plata	− 3 51 37	−0·161539	+39·59	−34 54 30	9·8408$_n$	9·6817	0·6986$_n$	0·9430	
Launceston (Tasm.) ...	+ 9 48 31	+0·408692	−96·68	−41 26 01	9·9428$_n$	9·6429	0·7619$_n$	0·9428	A. B. Biggs
Lawrence Obs.	− 4 50 04·7	−0·201443	+47·65	+42 22 17	9·9571	9·6366	0·7698	0·9428	Amherst (Mass.)
Leander McCormick Obs.	− 5 14 00·7	−0·218064	+51·58	+38 02 01	9·8904	9·6643	0·7308	0·9429	Richmond (Vir.)
Leiden	+ 0 17 56·4	+0·012458	− 2·95	+52 09 20	0·1067	9·5561	0·8389	0·9426	
Leipzig	+ 0 49 34·0	+0·034422	− 8·14	+51 20 06	0·0939	9·5640	0·8340	0·9426	University Obs.*
Lick	− 8 06 34·1	−0·337895	+79·93	+37 20 23	9·8795	9·6684	0·7240	0·9430	Mt. Hamilton (Cal.)
Lisbon	− 0 36 44·7	−0·025518	+ 6·04	+38 42 31	9·9009	9·6603	0·7372	0·9429	
Litchfield Obs.	− 5 01 37·4	−0·209461	+49·55	+43 03 17	9·9675	9·6318	0·7754	0·9428	Clinton (N.Y.)
Louvain	+ 0 18 51·0	+0·013090	− 3·09	+50 52 40	0·0868	9·5683	0·8312	0·9426	Dr. Terby
Lübeck	+ 0 42 45·7	+0·029696	− 7·02	+53 51 31	0·1335	9·5391	0·8487	0·9425	
Lund	+ 0 52 45·0	+0·036632	− 8·67	+55 41 52	0·1631	9·5193	0·8586	0·9425	
Lyons	+ 0 19 07·9	+0·013286	− 3·14	+45 41 40	0·0076	9·6123	0·7960	0·9427	
Madras	+ 5 20 59·3	+0·222910	−52·73	+13 04 08	9·3628	9·7561	0·2949	0·9434	
Madrid	− 0 14 45·1	−0·010244	+ 2·42	+40 24 30	9·9271	9·6497	0·7529	0·9429	

* Same quantities for Dr. Engelmann's Observatory.

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	h m s	d	s	° ′ ″					
Markree	− 0 33 48·4	−0·023477	+ 5·55	+ 54 10 32	0·1386	9·5358	0·8504	0·9425	Col. Cooper
Marseilles	+ 0 21 34·6	+0·014984	− 3·54	+43 18 19	9·9713	9·6290	0·7775	0·9428	
Melbourne	+ 9 39 53·4	+0·402701	−95·26	−37 49 53	9·8872$_n$	9·6655	0·7288$_n$	0·9429	
Mexico	− 6 36 26·6	−0·275308	+65·13	+19 26 01	9·5446	9·7421	0·4628	0·9433	
Milan	+ 0 36 46·0	+0·025532	− 6·04	+45 27 59	0·0041	9·6141	0·7943	0·9427	
Modena	+ 0 43 42·9	+0·030358	− 7·18	+44 38 53	9·9917	9·6203	0·7881	0·9428	
Moncalieri	+ 0 30 49	+0·021399	− 5·06	+44 59 51	9·9970	9·6176	0·7907	0·9427	Near Turin
Morrison Obs.	− 6 11 18·0	−0·257847	+61·00	+39 13 46	9·9090	9·6571	0·7421	0·9429	Glasgow (Miss.)
Moscow	+ 2 30 17·2	+0·104366	−24·69	+55 45 20	0·1641	9·5187	0·8589	0·9425	
Munich	+ 0 46 26·1	+0·032247	− 7·63	+48 08 45	0·0448	9·5925	0·8134	0·9427	
Naples	+ 0 57 00·5	+0·039589	− 9·36	+40 51 45	9·9341	9·6467	0·7569	0·9429	Capo di Monte
Nashville (Tenn.)	− 5 47 08·0	−0·241065	+57·03	+36 08 58	9·8607	9·6750	0·7118	0·9430	Vanderbilt Univ.
Natal	+ 2 02 01·2	+0·084736	−20·04	−29 50 47	9·7558$_n$	9·7060	0·6378$_n$	0·9431	
Neuchatel	+ 0 27 49·9	+0·019328	− 4·57	+47 00 01	0·0274	9·6020	0·8054	0·9427	
New York (Col. Coll.)	− 4 55 53·6	−0·205481	+48·61	+40 45 23	9·9325	9·6474	0·7560	0·9429	
„ (Ruth.)	− 4 55 57·0	−0·205520	+48·62	+40 43 48	9·9321	9·6476	0·7557	0·9429	L. Rutherford
Nice	+ 0 29 12·3	+0·020281	− 4·80	+43 43 17	9·9776	9·6271	0·7808	0·9428	Montgros
Nicolaieff	+ 2 07 53·9	+0·088818	−21·01	+46 58 21	0·0270	9·6022	0·8052	0·9427	
Odessa	+ 2 03 02·4	+0·085444	−20·21	+46 28 36	0·0194	9·6062	0·8017	0·9427	

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	h m s	d	s	° ′ ″					
O'Gyalla	+ 1 12 45·6	+0·050528	−11·95	+47 52 27	0·0407	9·5948	0·8115	0·9427	Dr. von Konkoly
Orwell Park	+ 0 04 55·8	+0·003424	− 0·81	+52 00 33	0·1044	9·5576	0·8380	0·9426	Col. Tomline
Ougrée	+ 0 22 12	+0·015417	− 3·65	+50 37 06	0·0828	9·5707	0·8296	0·9426	Near Liège
Oxford (Radcliffe Obs.)...	− 0 05 02·6	−0·003502	+ 0·83	+51 45 36	0·1005	9·5600	0·8365	0·9426	
„ (University Obs.)	− 0 05 00·4	−0·003477	+ 0·82	+51 45 34					
„ (Mississippi) ...	− 5 58 07·1	−0·248693	+58·83	+34 22 13	9·8321	9·6845	0·6927	0·9430	
Padua	+ 0 47 29·2	+0·032977	− 7·80	+45 24 02	0·0031	9·6146	0·7938	0·9426	
Palermo	+ 0 53 24·7	+0·037091	− 8·77	+38 06 44	9·8916	9·6638	0·7315	0·9429	
Paris	+ 0 09 21·0	+0·006492	− 1·54	+48 50 11	0·0554	9·5866	0·8181	0·9426	
Philadelphia	− 5 00 38·5	−0·208779	+49·39	+39 57 07	9·9201	9·6526	0·7488	0·9429	
Plonsk	+ 1 21 32	+0·056620	−13·39	+52 37 39	0·1141	9·5515	0·8417	0·9426	Dr. Jedrzejewicz
Pola	+ 0 55 23·2	+0·038463	− 9·10	+44 51 49	9·9950	9·6186	0·7897	0·9427	
Potsdam	+ 0 52 15·9	+0·036295	− 8·58	+52 22 55	0·1102	9·5539	0·8402	0·9426	
Poughkeepsie (N.Y.) ...	− 4 55 33·6	−0·205250	+48·55	+41 41 18	9·9467	9·6412	0·7640	0·9428	
Poulkova	+ 2 01 18·6	+0·084243	−19·93	+59 46 19	0·2316	9·4705	0·8782	0·9422	
Prague	0 57 41·5	+0·040064	− 9·48	+50 05 18	0·0746	9·5755	0·8262	0·9426	I.R. Observatory
„	+ 0 57 47	+0·040127	− 9·49	+50 04 25	0·0744	9·5757	0·8261	0·9426	Prof. Safarik
Princeton (N.J.) ...	− 4 58 37·5	−0·207378	+49·06	+40 20 58	9·9262	9·6500	0·7523	0·9429	
Providence (R.I.) ...	− 4 45 37·6	−0·198352	+46·92	+41 49 46	9·9489	9·6403	0·7653	0·9428	F. E. Seagrave

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Names.		Longitudes from Greenwich. Time. h m s	Longitudes from Greenwich. Parts of Day. d	Correction to S.T.M.N. s	Latitudes. ° ′ ″	tan φ.	Constants. log A.	Constants. log D.	Constants. log P.	
Puebla (Mexico)...	...	− 6 32 41	−0·272697	+64·50	+19 02 30	9·5350	9·7431	0·4542	0·9433	
Rio de Janeiro ...	...	− 2 52 41·4	−0·119924	+28·37	−22 54 24	9·6229$_n$	9·7319	0·5310$_n$	0·9433	
Rome (Coll. Rom.)	...	+ 0 49 55·5	+0·034670	− 8·20	+41 53 54	9·9499	9·6398	0·7658	0·9428	
,, (Capitol) ...	...	+ 0 49 56·5	+0·034682	− 8·20	+41 53 33	9·9498	9·6399	0·7658	0·9428	
St. Louis (Miss.)	...	− 6 00 49·1	−0·250568	+59·27	+38 38 04	9·8997	9 6607	0·7365	0·9429	
St. Petersburg ...	...	+ 2 01 11·4	+0·084160	−19·91	+59 56 32	0·2346	9·4682	0·8789	0·9424	University
San Fernando ...	...	− 0 24 49·2	−0·017236	+ 4 08	+36 27 41	9·8656	9·6733	0 7150	0·9430	
San Francisco (Cal.)	...	− 8 09 42·5	−0·340075	+80·46	+37 47 24	9·8866	9·6657	0·7284	0·9429	G. Davidson
Santiago (Chili)	...	− 4 42 46·3	−0·196369	+46·45	−33 26 42	9·8169	9·6892	0·6822	0 9430	
Sayre Observatory	...	− 5 01 31·9	−0·209397	+49·53	+40 36 24	9·9302	9·6484	0·7546	0·9429	S. Bethlehem
Scarborough ...	...	− 0 01 38·9	−0·001145	+ 0·27	+54 16 30	0·1402	9·5347	0·8510	0·9425	R. Wigglesworth
Smith Obs., Geneva (N.Y.)		− 5 08 00	−0·213889	+50·60	+42 53 00	9·9649	9·6330	0 7740	0·9427	W. R. Brooks
South Hadley ...	...	− 4 50 20·3	−0·201624	+47·70	+42 15 18	9 9554	9·6374	0·7688	0·9428	
Stockholm ...	...	+ 1 12 14·0	+0·050162	−11·87	+59 20 34	0·2242	9·4760	0·8762	0·9424	
Stonyhurst ...	...	− 0 09 52·7	−0·006860	+ 1·62	+53 50 40	0·1333	9·5392	0·8486	0·9425	
Strasburg ...	...	+ 0 31 04·7	+0·021582	− 5·11	+48 35 00	0·0515	9·5888	0·8164	0·9428	
Sydney (N.S.W.)	...	+10 04 48·5	+0·420006	−99·35	−33 51 41	9·8238$_n$	9·6871	0·6870$_n$	0·9430	
Tacubaya ...	...	− 6 36 46·5	−0·275538	+65·18	+19 24 17	9·5439	9·7422	0·4621	0·9433	
Tashkent... ...	...	+ 4 37 10·8	+0·192486	−45·54	+41 19 32	9·9412	9·6437	0·7609	0·9428	

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Names.	Longitudes from Greenwich. Time.	Longitudes from Greenwich. Parts of Day.	Correction to S.T.M.N.	Latitudes.	tan φ′.	Constants. log A.	Constants. log D.	Constants. log P.	
	h m s	d	s	° ′ ″					
Toulouse … … …	+ 0 05 51·0	+0·004063	− 0·96	+43 36 45	9·9760	9·6279	0·7799	0·9428	
Trieste … … …	+ 0 55 02·1	+0·038219	− 9·04	+45 38 34	0·0068	9·6127	0·7956	0·9427	
Tulse Hill … …	− 0 00 27·7	−0·000321	+ 0·08	+51 26 47	0·0956	9·5630	0·8346	0·9426	Dr. W. Huggins
Turin … … …	+ 0 30 47·2	+0·021380	− 5·06	+45 04 08	9·9981	9·6171	0·7913	0·9427	
Upsala … … …	+ 1 10 30·2	+0·048961	−11·58	+59 51 29	0·2331	9·4693	0·8785	0·9424	
Urbino … … …	+ 0 50 33·1	+0·035105	− 8·30	+43 43 30	9·9777	9·6270	0·7808	0·9428	
Utrecht … … …	+ 0 20 31·7	+0·014256	− 3·37	+52 05 09	0·1056	9·5568	0·8385	0·9426	
Venice … … …	+ 0 49 25·8	+0·034326	− 8·12	+45 25 49	0·0036	9·6143	0·7940	0·9427	
Vienna … … …	+ 1 05 21·5	+0·045388	−10·74	+48 13 55	0·0461	9·5918	0·8140	0·9427	Imp. Obs.
Warner Observatory …	− 5 10 21·8	−0·215530	+50·99	+43 09 17	9·9690	9·6311	0·7763	0·9482	Rochester, N.Y.
Warsaw … … …	+ 1 24 07·3	+0·058418	−13·82	+52 13 06	0·1076	9·5555	0·8393	0·9426	
Washburn Observatory…	− 5 57 36·2	−0·248355	+58·75	+43 04 37	9·9679	9·6317	0·7756	0·9428	Madison (Wis.)
Washington … …	− 5 08 12·0	−0·214028	+50·63	+38 53 39	9·9038	9·6591	0·7390	0·9429	
Wilhelmshaven … …	+ 0 32 35·2	+0·022630	− 5·35	+53 31 52	0·1283	9·5424	0·8468	0·9425	
Williamstown (Mass.) …	− 4 52 53·4	−0·203396	+48·11	+42 42 49	9·9623	9·6342	0·7726	0·9428	
Wilna … … …	+ 1 41 09·0	+0·070243	−16·62	+54 40 59	0·1467	9·5304	0·8532	0·9425	
Winchester Observatory	− 4 51 42·1	−0·202571	+47·92	+41 18 37	9·9409	9·6438	0·7608	0·9428	New Haven (Conn.)
Windsor (N.S.W.) …	+10 03 19·2	+0·418972	−99·11	−33 36 31	9·8196$_n$	9·6884	0·6841$_n$	0·9430	J. Tebbutt
Zürich … … …	+ 0 34 12·4	+0·023755	− 5·62	+47 22 40	0·0331	9·5989	0·8081	0·9427	

Observations of Comet a 1888 (Sawerthal), made at the Radcliffe Observatory, Oxford.

(*Communicated by E. J. Stone, M.A., F.R.S., Radcliffe Observer.*)

The following observations of Comet Sawerthal were made with the Barclay equatorial, using the ring-micrometer, with power 100. On account of the faintness of the comet the observations were very difficult, and the probable errors of the results must therefore be regarded as much larger than those of the earlier series.

1888.		Greenwich Mean Time.	Observer.	Comet−Star Δ R.A. (Corrected for	Comet−Star Δ N.P.D. Refraction only.)	No. of Comps.	Apparent R.A. of Comet.	Log $p\Delta$	Apparent N.P.D. of Comet.	Log $p\Delta$	Comp. Star.
		h m s		m s	′ ″		h m s		° ′ ″		
July	3	11 25 22	W.	−0 15·99	−2 52·07	4	1 3 3·58	9·4065	41 29 53·3	0·4185	1
	5	11 7 27	F. B.	−3 50·00	−5 34·39	5	1 4 9·22	9·4029	41 4 25·6	0·4295	2
	12	11 3 1	R.	+0 15·10	+5 37·53	12	1 7 5·18	9·4196	39 38 56·9	0·3870	3
Aug.	8	12 4 3	W.	−1 2·63	−1 1·62	12	0 59 49·44	9·3798	35 36 50·6	9·8646	4

Assumed Places of Comparison Stars.

Comp. Star.	Mean R.A. 1888·0.	Reduction to Apparent Place.	Mean N.P.D. 1888·0.	Reduction to Apparent Place.	Authority.
	h m s	s	° ′ ″	″	
1	1 3 18·57	+1·00	41 32 34·15	+11·21	Mean of Radcliffe I. 347, Oeltz. Arg. (N.) 1155, and Lalande 2011.
2	1 7 58·17	+1·05	41 9 48·87	+11·11	Mean of Radcliffe I. 379 and Paris 1566.
3	1 6 48·70	+1·38	39 33 8·96	+10·38	Oeltz. Arg. (N.) 1236.
4	1 0 49·18	+2·89	35 37 46·08	+ 6·18	Mean of Radcliffe I. 329 and Greenwich (1872) 103, adopting proper motions of $+0^s\!.386$ in R.A., and $+1''\!.56$ in N.P.D.

Observers' Remarks.

1888, July 3.—Clouds keep passing. Tail estimated at 8′ in length, but nucleus only glimmers out now and then; end of luminosity observed. The "wing" appendages seen on May 23 have disappeared.

July 5.—Nucleus showed up at times, and was then as bright as an 11th magnitude star. The nucleus was observed when visible. Clouds were continually passing.

July 12.—The nucleus exceedingly faint, and only seen occasionally. Observations very difficult.

August 8.—Night exceptionally fine. When the eye became accustomed to the field, which was rich with small stars, the comet could be distinguished as very faint luminous haze. Occasionally a coma showed itself as a brightening near the head of the luminosity.

Observers: W., Mr. W. Wickham; R., Mr. W. H. Robinson; F. B., Mr. F. A. Bellamy.

Radcliffe Observatory, Oxford:
1888, *November* 8.

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Observations of Comet e 1888 (*Barnard*), *made at Stonyhurst College Observatory.* By the Rev. W. J. Crofton, S.J., B.A.

(*Communicated by the Rev. S. J. Perry.*)

1888.	Stonyhurst Mean Time.	✱ − ☄ R.A.	✱ − ☄ N.P.D.	No. of Comps.	Comp. Star.
	h m s	s	′ ″		
Oct. 12	16 6 29	+37·71	−13 29·0	10	*a*
„ 13	15 28 20	− 0·60	− 9 54·0	9	*b*

Mean Places of Comparison Stars.

Comp. Star.	R.A. 1888·0.	N.P.D. 1888·0.	Authority.
	h m s	° ′ ″	
a	6 23 46·86	82 46 53·2	Lal. 12434
b	6 21 18·70	82 59 53·4	W.B. VI. 579

Observers: W. J. Crofton and W. Carlisle.

The observations were taken over two bars at right angles and inclined at 45° to the declination circle. The corrections for refraction and parallax have been applied.

The comet presented a starry nucleus (estimated 10–11 mag.), surrounded by a round nebulosity, but without tail. On the 12th, what appeared a 10th mag. star was perceived through the body of the comet, towards the edge. It was not seen on the 13th.